What is claimed is:

1. A transdermal sampling system, comprising:

at least one sampler for retrieving and transferring at least one analyte obtained transdermally from the skin of a subject;

at least one detector system for identifying and quantifying said at least one analyte; and

at least one logic module for (i) receiving and storing input data from said at least one detector, (ii) relating the input data to other data obtained from the subject, (iii) displaying output information, (iv) transmitting the output information to another system, and (v) controlling the operation of said at least one sampler and at least one detector.

2. The system of claim 1, wherein said at least one sampler is a microfabricated device comprising a microfluidic assembly.

3. The system of claim 2, wherein said microfluidic assembly comprises at least one reservoir and at least one conduit in communication with said reservoir for retrieving and transmitting said at least one analyte through said at least one conduit, and said at least one detector is in association with said at least one conduit for detecting said at least one analyte received and transmitted through said at least one conduit.

4. The system of claim 1, wherein said at least one sampler further comprises means for enhancing permeability of the skin of a subject for retrieving said at least one analyte therefrom.

5. The system of claim 4, wherein said means for enhancing permeability comprises a microheater disposed to be in close proximity to a subject's skin surface, and configured for ablating a portion of the stratum corneum of the skin of a subject to allow collection of interstitial fluid from the subject's underlying viable epidermis.

6. The system of claim 4, wherein said means for enhancing permeability comprises a microheater disposed to be in close proximity to a

subject's skin surface, and configured for ablating a portion of the stratum corneum of the skin of a subject to allow access to interstitial fluid from the subject's underlying viable epidermis.

7. The system of claim 4, wherein said means for enhancing permeability of the skin comprises a radiation source positioned for generating and directing radiation to a subject's skin surface, effective to ablate a portion of the stratum corneum of the skin of a subject, to allow collection of interstitial fluid from the subject's underlying viable epidermis.

8. The system of claim 7, wherein said radiation source is a light source.

9. The system of claim 8, wherein said light source is a laser.

10. The system of claim 4, wherein said means for enhancing permeability of the skin comprises a radiation source positioned for generating and directing radiation to a subject's skin surface, effective to ablate a portion of the stratum corneum of the skin of a subject, to allow diffusion from interstitial fluid from the subject's underlying viable epidermis.

11. The system of claim 4, wherein said means for enhancing permeability of the skin is at least one of: (i) means for chemically altering the surface of the skin; (ii) means for puncturing the surface of the skin; (iii) means for solubilizing the surface of the skin; (iv) means for illuminating the surface of the skin sufficient to cause ablation thereof; and (v) means for irradiating the surface of the skin to cause ablation thereof.

12. The system of claim 1, wherein:

said at least one sampler comprises a plurality of samplers; and said at least one detector system comprises a plurality of detector systems.

13. The system of claim 1, wherein said at least one detector system comprises an optical detection system comprised of light sources effective to excite fluorophores, and at least one detector for detecting fluorescence from excited fluorophores.

14. The system of claim 13, wherein said light source comprises at least one LED.

15. The system of claim 13, wherein said light source comprises at least one laser.

16. The system of claim 3, wherein said at least one reservoir contains a fluid, and is positioned for transmitting the fluid to a subject's skin to promote flow of said at least one analyte into said at least one conduit.

17. The system of claim 16, wherein said fluid contained in said at least one reservoir is capable of permeating a subject's skin.

18. The system of claim 16, further comprising a breakable seal for retaining said fluid in said reservoir prior to sampling analytes from a subject.

19. The system of claim 1, further comprising an adhesive on said sampler for adhering the sampler to the skin of a subject.

20. The system of claim 1, further comprising at least one substance located in said sampler which is capable of binding an analyte of interest, and said substance being detectable by said at least one detector system.

21. The system of claim 16, further comprising a pump for pumping said fluid into contact with the skin of a subject.

22. The system of claim 21, further comprising a microheater disposed to be in close proximity to a subject's skin surface at a location proximate to where said fluid is pumped into contact with the skin of a subject, and is configured for ablating a portion of the stratum corneum of the skin of a subject.

23. The system of claim 1, further comprising means for monitoring predetermined physiological data as said other data, for relating to the input data by said at least one logic module.

24. The system of claim 1, further comprising means for monitoring environmental conditions data as said other data, for relating to the input data by said at least one logic module.

25. The system of claim 1, wherein said at least one detector system comprises a patch sensitive to at least one analyte for changing color in response to contact with said at least one analyte, and at least one detector for detecting a change in color of the patch.

26. A microfabricated device for allowing remote monitoring of a subject, comprising: at least one sampler unit body for retrieving and transferring at least one analyte obtained transdermally from the skin of a subject; at least one detector system connected to said at least one sampler unit body for identifying and quantifying at least one analyte obtained from a subject; and a transmitter/receiver for transmitting data relating to at least one analyte detected by said detection system to a logic module for processing thereby, and for allowing control of the microfabricated device by a logic module.

27. The device of claim 26, wherein the sample unit body further comprises a microfluidic assembly.

28. The device of claim 27, wherein said microfluidic assembly comprises at least one reservoir and at least one conduit in communication with said reservoir for retrieving and transmitting said at least one analyte through said at least one conduit, and said at least one detector being in association with said at least one conduit for detecting said at least one analyte which has been received and transmitted through said at least one conduit.

29. The device of claim 26, wherein said at least one sampler unit body further comprises means for enhancing permeability of the skin of a subject for retrieving said at least one analyte therefrom.

30. The device of claim 29, wherein said means for enhancing permeability comprises a microheater disposed to be in close proximity to a subject's skin surface, and configured for ablating a portion of the stratum corneum of the skin of a subject to allow collection of interstitial fluid from the subject's underlying viable epidermis.

31. The device of claim 29, wherein said means for enhancing permeability of the skin comprises a radiation source positioned for generating and directing radiation to a subject's skin surface, effective to ablate a portion of the stratum corneum of the skin of a subject, to allow diffusion from interstitial fluid from the subject's underlying viable epidermis.

32. The device of claim 31, wherein said radiation source is a light source.

33. The device of claim 32, wherein said light source is a laser.

34. The device of claim 29, wherein said means for enhancing permeability of the skin is at least one of; (i) means for chemically altering the surface of the skin, (ii) means for puncturing the surface of the skin, (iii) means for solubilizing the surface of the skin, (iv) means for illuminating the surface of the skin sufficient to cause ablation thereof, and (v) means for irradiating the surface of the skin to cause ablation thereof.

35. The device of claim 26, wherein;

said at least one sampler unit body comprises a plurality of sampling conduits; and said at least one detector system comprises a plurality of detector systems.

36. The device of claim 1, wherein said at least one detector system comprises an optical detection system comprised of light sources effective to excite flurophores, and at least one detector for detecting fluorescence from excited fluorophores.

37. The device of claim 36, wherein said light source comprises at least one LED.

38. The device of claim 36, wherein said light source comprises at least one laser.

39. The device of claim 28, wherein said at least one reservoir contains a fluid, and is positioned for transmitting the fluid to a subject's skin to promote flow of said at least one analyte into said at least one conduit.

40. The device of claim 39, wherein said fluid contained in said at least one reservoir is capable of permeating a subject's skin.

41. The device of claim 39, further comprising a breakable seal for retaining said fluid in said reservoir prior to sampling analytes from a subject.

42. The device of claim 26, further comprising an adhesive on said sampler for adhering the sample to the skin of a subject.

43. The device of claim 26, further comprising at least one substance in said sampler unit body which is capable of binding an analyte of interest, and said substance being detectable by said at least one detector system.

44. The device of claim 26, wherein said at least one detector system comprises a patch sensitive to at least one analyte for changing color in response to contact with said at least one analyte, positioned in said sampler unit body for contact with said at least one analyte, and at least one detector in said sampler unit body positioned for detecting a change in color of the patch.

45. The device of claim 26, wherein: said sampler unit body is a silicon body having an array of capillary conduits extending therethrough for sampling analyte from the skin of a subject through said capillary conduits; and at least one detector chamber associated with said at least one detection system, and in communication with said capillary conduits for detecting analytes received within the capillary chamber.

46. The device of claim 45, wherein said at least one sampler further comprises means for enhancing permeability of the skin of a subject for retrieving said at least one analyte therefrom.

47. The device of claim 46, wherein said means for enhancing permeability comprises a microheater disposed to be in close proximity to a subject's skin surface, and configured for ablating a portion of the stratum corneum of the skin of a subject to allow collection of interstitial fluid from the subject's underlying viable epidermis.

48. The device of claim 46, wherein said means for enhancing permeability comprises a microheater disposed to be in close proximity to a subject's skin surface, and configured for ablating a portion of the stratum corneum of the skin of a subject to allow diffusion from interstitial fluid from the subject's underlying viable epidermis.

49. The device of claim 46, wherein said means for enhancing permeability of the skin comprises a radiation source positioned for generating and directing radiation to a subject's skin surface, effective to ablate a portion of the stratum corneum of the skin of a subject to allow collection of interstitial fluid from the subject's underlying viable epidermis.

50. The device of claim 46, wherein said means for enhancing permeability of the skin comprises a radiation source positioned for generating and directing radiation to a subject's skin surface, effective to ablate a portion of the stratum corneum of the skin of a subject to allow diffusion from interstitial fluid from the subject's underlying viable epidermis.

51. The device of claim 50, wherein said radiation source is a light source.

52. The device of claim 51, wherein said light source is a laser.

53. The device of claim 46, wherein said means for enhancing permeability of the skin is at least one of; (i) means for chemically altering the surface of the skin, (ii) means for puncturing the surface of the skin, (iii) means for solubilizing the surface of the skin, (iv) means for illuminating the surface of the skin sufficient to cause ablation thereof, and (v) means for irradiating the surface of the skin to cause ablation thereof.

54. The device of claim 46, wherein said at least one detector system comprises an optical detection system comprised of light sources effective to excite flurophores, and at least one detector for detecting fluorescence from excited fluorophores.

55. The device of claim 54, wherein said light source comprises at least one LED.

56. The device of claim 54, wherein said light source comprises at least one laser.

57. The device of claim 46, wherein said silicon body comprises at least one reservoir capable of containing a fluid, and in communication with said capillary conduits, for transmitting the fluid to a subject's skin to promote flow of said at least one analyte into at least one of said capillary conduits.

58. The device of claim 57, wherein said silicon body further comprises a microheater disposed to be in close proximity to a subject's skin surface at a location proximate to where said fluid is pumped into contact with the skin of a subject, and is configured for ablating a portion of the stratum corneum of the skin of a subject.

59. A microfabricated device for sampling analytes from the skin of a subject, comprising:

a detection chamber for receiving analytes retrieved from the skin of a subject;

a photonic detection system, comprising a photonics source located attached to said microfabricated device in association with said detection chamber, and detectors associated with said detection chamber for detecting analytes received in said detection chamber.

60. The device of claim 59, wherein said photonics source is at least one LED.

61. The device of claim 59, wherein said photonics source is at least one laser.

62. The device of claim 59, further comprising substances in said device which bind with selected analytes, and which fluoresce when said photonics source applies radiation thereto.

63. A microfabricated device for sampling analytes from the skin of a subject, comprising:

a detection chamber for receiving analytes retrieved from the skin of a subject;

a patch which changes color when contacted by predetermined analytes, located attached to said microfabricated device in association with said detection chamber; and

detectors associated with said detection chamber, for detecting a change of color of the patch indicating the presence of a predetermined analyte.

64. A microfabricated device for sampling and detecting analytes retrieved from the skin of a subject, comprising:

at least one conduit for retrieving and transmitting an analyte from the skin of a subject to a detector; and

means for enhancing permeability of the skin of a subject for retrieving said at least one analyte therefrom.

65. The device of claim 64, wherein said means for enhancing permeability comprises a microheater disposed to be in close proximity to a subject's skin surface, and configured for ablating a portion of the stratum corneum of the skin of a subject to allow collection of interstitial fluid from the subject's underlying viable epidermis.

66. The device of claim 64, wherein said means for enhancing permeability comprises a microheater disposed to be in close proximity to a subject's skin surface, and configured for ablating a portion of the stratum corneum of the skin of a subject to allow diffusion from interstitial fluid from the subject's underlying viable epidermis.

67. The device of claim 64, wherein said means for enhancing permeability of the skin comprises a radiation source positioned for generating and directing radiation to a subject's skin surface, effective to ablate a portion of the stratum corneum of the skin of a subject, to allow collection of interstitial fluid from the subject's underlying viable epidermis.

68. The device of claim 64, wherein said means for enhancing permeability of the skin comprises a radiation source positioned for generating and directing radiation to a subject's skin surface, effective to ablate a portion of the stratum corneum of the skin of a subject, to allow diffusion from interstitial fluid from the subject's underlying viable epidermis.

69. The device of claim 67, wherein said radiation source is a light source.

70. The device of claim 69, wherein said light source is a laser.

71. The device of claim 64, wherein said means for enhancing permeability of the skin is at least one of: (i) means for chemically altering the surface of the skin; (ii) means for puncturing the surface of the skin; (iii) means for solubilizing the surface of the skin; (iv) means for illuminating the surface of the skin sufficient to cause ablation thereof; and (v) means for irradiating the surface of the skin to cause ablation thereof.

72. A transdermal sampling system, comprising:

a microfluidic assembly for retrieving and transferring at least one analyte obtained transdermally from the skin of a subject;

at least one detector system for identifying and quantifying said at least one analyte; and

at least one logic module for (i) receiving and storing input data from said at least one detector, (ii) relating the input data to other data obtained from the subject, (iii) displaying output information, (iv) transmitting the output information to another system, and (v) controlling the operation of said at least one sampler and at least one detector.

73. The transdermal sampling system according to claim 72, wherein the microfluidic assembly comprises at least one serpentine capillary channel.

74. The transdermal sampling system according to claim 72, wherein the microfluidic assembly further comprises

at least one reservoir channel,

at least one bottom capping section, and

at least one top capping section.

75. The transdermal sampling system according to claim 72, wherein the at least one reservoir channel further comprises at least one seal for retaining a physiologically compatible fluid within the at least one reservoir channel.

76. The transdermal sampling system according to claim 74, wherein the at least bottom capping section comprises a micro-heating element.

77. The transdermal sampling system according to claim 76, wherein the micro-heating element serves to ablate stratum corneum.

78. The transdermal sampling system according to claim 76, wherein the micro-heating element serves to rupture the at least one seal.

79. The transdermal sampling system according to claim 76, wherein the micro-heating element serves both to ablate stratum corneum and to rupture the at least one seal.

80. The transdermal sampling system according to claim 74, wherein the at least one top capping section comprises two or more electrodes.

81. The transdermal sampling system according to claim 80, wherein the two or more electrodes serve to assist the flow of a physiologically compatible fluid through the at least one serpentine capillary channel.

82. The transdermal sampling system according to claim 74, wherein the microfluidic assembly further comprises a sensor for detecting the at least one analyte.

83. The transdermal sampling system according to claim 82, wherein the sensor comprises an optical detection system comprised of at least one light source effective to excite fluorophores, and at least one detector for detecting fluorescence from excited fluorophores.

84. The transdermal sampling system according to claim 83, wherein the at least one light source comprises at least one LED.

85. The transdermal sampling system according to claim 83, wherein the at least one light source comprises at least one laser.

86. The transdermal sampling system according to claim 82, wherein the sensor for detecting the at least one analyte comprises a patch sensitive to the at least one analyte for changing color in response to contact with the at least one analyte, and at least one detector for detecting a change in color of the patch.

87. A transdermal sampling system, comprising:

a microfluidic assembly for retrieving and transferring at least one analyte obtained transdermally from the skin of a subject;

at least one detector system for identifying and quantifying said at least one analyte; and

at least one logic module for (i) receiving and storing input data from said at least one detector, (ii) relating the input data to other data obtained from the subject, (iii) displaying output information, (iv) transmitting the output information to another system, and (v) controlling the operation of said at least one sampler and at least one detector,

wherein the microfluidic assembly contains a physiologically compatible fluid for retrieving and transferring at least one analyte obtained transdermally from the skin of a subject, and

wherein the microfluidic assembly is adhered to the skin of the subject.

88. The transdermal sampling system according to claim 87, wherein the adhesion of the microfluidic assembly to the skin of the subject is achieved by means of an adhesive.

89. The transdermal sampling system according to claim 88, wherein the adhesive serves to prevent movement of the transdermal sampling system relative to the skin of the subject.

90. The transdermal sampling system according to claim 87, wherein the adhesive serves to prevent loss of the physiologically compatible fluid.

91. The transdermal sampling system according to claim 89, wherein the adhesive is water impermeable.

92. A transdermal sampling system, comprising:

a microfluidic assembly for retrieving and transferring at least one analyte obtained transdermally from the skin of a subject;

at least one detector system for identifying and quantifying said at least one analyte; and

at least one logic module for (i) receiving and storing input data from said at least one detector, (ii) relating the input data to other data obtained from the subject, (iii) displaying output information, (iv) transmitting the output information to another system, and (v) controlling the operation of said at least one sampler and at least one detector,

wherein at least one surface of the microfluidic assembly is modified.

93. The transdermal sampling system according to claim 92, wherein the modification of the at least one surface of the microfluidic assembly prevents the adsorption of protein to the at least one surface of the microfluidic assembly.

94. The transdermal sampling system according to claim 92, wherein the modification of the at least one surface of the microfluidic assembly attaches to the at least one surface of the microfluidic assembly at least one specific-binding molecule which specifically binds the at least one analyte.

95. The transdermal sampling system according to claim 94, wherein the at least one specific-binding molecule is bound with at least one fluorescently labeled analyte,

wherein the at least one analyte obtained transdermally from the skin of a subject displaces the bound at least one fluorescently labeled analyte, and

wherein measurement of the amount of fluorescence displaced from the at least one specific-binding molecule correlates with the amount of the at least one analyte obtained transdermally from the skin of a subject.

96. The transdermal sampling system according to claim 94, wherein the at least one specific-binding molecule is an antibody which specifically binds the at least one analyte.

97. The transdermal sampling system according to claim 94, wherein the at least one specific-binding molecule is an antibody fragment which specifically binds the at least one analyte.

98. The transdermal sampling system according to claim 94, wherein the at least one specific-binding molecule is an artificial antibody which specifically binds the at least one analyte.

99. The transdermal sampling system according to claim 94, wherein the at least one specific-binding molecule is an artificial antibody which specifically binds the at least one analyte.

100. The transdermal sampling system according to claim 94, wherein the at least one specific-binding molecule is a lectin which specifically binds the at least one analyte.

101. The transdermal sampling system according to claim 94, wherein the at least one specific-binding molecule is a hybridizable nucleic acid which specifically binds the at least one analyte.

102. The transdermal sampling system according to claim 94, wherein the at least one specific-binding molecule is a nucleic acid-binding protein which specifically binds the at least one analyte.

103. The transdermal sampling system according to claim 94, wherein the at least one specific-binding molecule is a protein-binding protein which specifically binds the at least one analyte.

104. The transdermal sampling system according to claim 94, wherein the at least one specific-binding molecule is a cofactor-binding protein which specifically binds the at least one analyte.

105. A method of biomedically monitoring a subject's condition, comprising:

ablating a subject's skin to allow interstitial fluid to perfuse therethrough;

collecting interstitial fluid from the subject's ablated skin;

identifying and quantifying at least one type of selected molecules contained in the collected interstitial fluid.

106. The method of claim 105, wherein the at least one type of molecule is a metabolic marker of stress.

107. The method of claim 105, wherein the at least one type of molecule is at least one of an organophosphate, microbial toxin, inflammatory sequeli to microbial toxin, spore metabolite, prealbumin, C-reactive protein, troponin I, estrogen, and testosterone.

108. The method of claim 105, further comprising monitoring at least one of the subject's vital physiologically statistics.

109. The method of claim 108, wherein said at least one of the subject's vital physiological statistics comprises at least one of body temperature, pulse rate, blood pressure, and heart activity.

110. The method of claim 105, further comprising monitoring and detecting environmental conditions in which the subject is located.

111. The method of claim 105, wherein said identifying and quantifying comprises transferring said at least one type of molecule to a patch which changes color when in contact with said at least one type of molecule, and detecting a change in color of the patch.

112. The method of claim 105, wherein said identifying and quantifying comprises binding the at least one type of molecule with a second type of molecule which fluoresces when irradiated, irradiating the at least one type of molecule bound to the second type of molecule, and detecting any resultant fluorescence.

113. The method of claim 112, wherein the radiation source is a laser.

114. The method of claim 112, wherein the radiation source is an LED.